

### **REMARKS**

Applicant appreciates the Examiner's thorough examination of the subject application and requests reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 1-15 are pending in the subject application.

Claims 11-15 are withdrawn from consideration as the result of an Examiner's earlier restriction requirement. In view of the Examiner's restriction requirement, Applicant reserves the right to present the above-identified withdrawn claims in a divisional application. Also and in the interests of advancing prosecution, Applicant has canceled the withdrawn claims in the foregoing amendment.

Claims 1-10 stand rejected under 35 U.S.C. §102 and/or 35 U.S.C. §103.

As indicated above, claims 11-15 were canceled in the instant amendment without prejudice to prosecuting them in a continuing divisional application.

Claim 1 was amended for clarity to clarify the controlling aspects/arrangement of the control section. The format of claim 1 also was amended for clarity as well.

Claim 2 was amended to be consistent with the language of amended claim 1.

Claims 3-7 and 9 were amended for clarity. Some of the limitations of claim 3 were deleted and introduced in new claim 16.

Claims 17-34 were added to more distinctly claim embodiments and aspects of the present invention.

The amendments to the claims are supported by the originally filed disclosure.

### 35 U.S.C. §102 REJECTIONS

The Examiner rejected claims 1, 2, 8 and 10 under 35 U.S.C. §102(b) as being anticipated by Miida [USP 6,504,194]. Because claims were amended in the instant amendment, the following discussion refers to the language of the amended claims. However, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference.

As grounds for the rejection, the Office Action asserts that Miida discloses a control section for resetting the charges accumulated in the charge accumulation region after the output signal is outputted from the transistor section, injects charges into the charge accumulation region before discharging the accumulated charges from the charge accumulation region. In this regard, the Office Action refers to figure 8 of Miida. As to claim 2, it is further asserted that Miida discloses a control section that injects charges into the charge accumulation region from the substrate by applying a first gate voltage to the gate electrode. Applicant respectfully traverses as well as respectfully disagreeing with that characterized as being described and taught in Miida.

Applicant claims, claim 1, a solid -state imaging device that includes, at least one pixel section that includes a light receiving section and a transistor section and a control section that controls operation of the at least one pixel section. The light receiving section outputs charges by

performing photo-electric conversion of light incident thereon and the transistor section has a charge accumulation region for accumulating the charges output by the light receiving section. Also, the transistor section outputs an output signal representing a voltage value corresponding to an amount of charges accumulated in the charge accumulation region. Further, the control section controls the resetting of the charges accumulated in the charge accumulation region after the output signal is output from the transistor section. As set forth in the claims such resetting includes injecting charges into the charge accumulation region before discharging the accumulated charges from the charge accumulation region.

As is described in the subject application and Miida, charges from the light receiving section resulting from the photo-electric conversion process are accumulated in the charge accumulation region before the transistor section outputs an output signal representing a voltage value corresponding to the amount of charges that were accumulated in the charge accumulation region. As also described in the subject application and in Miida following the outputting of this output signal a process or operation is performed to deal with the charges from the light receiving section that were accumulated in the charge accumulation region. In contrast to that asserted in the Office Action, however, the resetting operation described in the subject application and claimed by Applicant for dealing with the accumulated charges is different from the sweeping operation described and taught in Miida also for dealing with the accumulated charges.

The following excerpts from Miida describe the sweeping operation that is performed in Miida (see col. 5, lin 56 - col. 6, line 17 thereof).

In the above MOS image sensor, a device operation for detecting the light signal is carried out repeatedly like sweep period (initialization period)-store period-read period-sweep period (initialization period)- . . . .

In the sweep period (initialization period), before the light emitting charges (light emitting carriers) are stored, the carrier pocket 25 is made empty by eliminating the light emitting charges *which have been read*. In addition, residual charges such as the holes, the electrons, etc., which are trapped at the surface state or neutralize acceptors, donors, etc., are eliminated from the semiconductor prior to the reading of the light signal. A voltage of more than about +5 V, normally about 7 to 8 V, is applied to the source region, the drain region, and the gate electrode. (Italics added for emphasis)

In the store period, the carriers are generated by the light irradiation, then drifted in the first well region 15a and the second well region 15b, and then stored in the carrier pocket 25. A voltage of almost +2 to 3 V is applied to the drain region, and also a low voltage by which the MOS transistor 112 can be held at its cut-off state is applied to the gate electrode.

In the read period, change in the threshold voltage of the light signal detecting MOS transistor due to the light emitting charges stored in the carrier pocket is read as change in source potential. In order to make the MOS transistor 112 operate in its saturation state, a voltage of almost +2 to 3 V is applied to the drain region and a voltage of almost +2 to 3 V is applied to the gate electrode.

As described in the subject application and as claimed by applicant, prior to discharging charges from the charge accumulation region and after outputting the output signal from the transistor section, the resetting operation described and claimed by Applicant includes injecting charges into the charge accumulation region. In other words, after the signal is read out but before the charges are discharged, further charges are injected into the charge accumulation

region. It is clear from the claims and the subject specification, that the charges being injected are not those charges that were outputted by the light receiving section. Miida, as can be seen from the above excerpts there from, does not anywhere indicate that additional charges beyond those outputted by the photo diode are stored in the carrier pocket after a signal representative of the accumulated charges is read out during the read period.

In sum, the process described in Miida does not anywhere describe, teach or suggest injecting charges into the carrier pocket, more specifically injecting charges into the carrier pocket from the substrate. Further, Miida does not anywhere describe, teach or suggest injecting such charges into the carrier pocket as part of the sweeping process described therein.

Thus, Miida does not expressly nor inherently describe the solid-state imaging device as set forth in claim 1.

Each of claims 2, 8 and 10 depend respectively from claim 1. Therefore, at least because of their dependency from a base claim that is considered to be allowable, each of claims 2, 8 and 10 are considered to be in allowable form. This shall not be construed as an admission that claims 2, 8 and 10 are not separately patentable over the cited reference.

As indicated above, claim 2 adds the further limitations that a first gate voltage is applied to the gate electrode of the transistor section so as to cause the further charges to be injected into the charge accumulation region from the substrate. There is no description anywhere in Miida that by applying a voltage to the gate electrode, an electrical condition would be established that would allow or cause charges to migrate from the substrate into the carrier pocket. As also noted

above, there is no discussion anywhere of a charge injecting process being conducted as part of the sweep operation described in Miida. Thus, it cannot be said that Miida expressly or inherently discloses applying a voltage to the transistor section gate electrode so as to cause charges to be injected into a charge accumulation region from the substrate.

As provided in MPEP-2131, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegel Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Or stated another way, “The identical invention must be shown in as complete detail as is contained in the ... claims. *Richardson v Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ 2d. 1913, 1920 (Fed. Cir. 1989). Although identify of terminology is not required, the elements must be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990). It is clear from the foregoing remarks that the above identified claims are not anticipated by Miida.

In deciding the issue of anticipation, the trier of fact must identify the elements of the claims, determine their meaning in light of the specification and prosecution history, and identify *corresponding elements* disclosed in the allegedly anticipating reference (emphasis added, citations in support omitted). *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, 730 F. 2d 1452, 221 USPQ 481,485 (Fed. Cir. 1984). In concluding that the '770 Patent did not anticipate the claims, the Federal Circuit in *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Company et al.*, at 221 USPQ 485-486, further provides that:

The '770 patent discloses an entirely different device, composed of parts distinct from those of the claimed invention, and operating in a different way to

process different materials differently. Thus, there is no possible question of anticipation by equivalents. Citations omitted.

It is clear from the foregoing remarks, that there is no element(s) disclosed in Miida that corresponds to the control section of the claimed invention. It also is clear that the device described in Miida, in particular the sweeping operation thereof, functions and operates in a different manner from that of the claimed invention. Thus, there can be no disclosure or teaching in Miida of Applicant's invention.

It is respectfully submitted that for the foregoing reasons, claims 1, 2, 8 and 10 are patentable over the cited reference and thus, satisfy the requirements of 35 U.S.C. §102(b). As such, these claims, including the claims dependent therefrom are allowable.

#### 35 U.S.C. §103 REJECTIONS

Claims 3-7 and 9 stand rejected under 35 U.S.C. §103 as being unpatentable over Miida [USP 6,504,194]. Applicant respectfully traverses. It appears from the grounds of rejection in the Office Action that language in the claims was not given any patentable weight as the language was considered to be functional and not structural in nature. As indicated above, each of claims 3-7 and 9 were amended so the limitations of these claims were more structural in nature.

Each of claims 3-7 and 9 depend respectively from claim 1. Therefore, at least because of their dependency from a base claim that is considered to be allowable, each of claims 3-7 and 9

are considered to be in allowable form. This shall not be construed as an admission that each of claims 3-7 and 9 are not separately patentable over the cited reference.

In addition, it is admitted in the Office Action that there is no recitation in Miida of the voltage applied to the gate electrode to operate the device. As such, there can be no recitation in Miida as to how the control device therein controls the operation of the imaging device by application of such voltages to the gate electrode during any of the resetting, charge accumulation or charge reading processes/ operations such as for the solid-state imaging device claimed by Applicant. Thus, it is submitted that for this further reason any of claims 3-7 and 9 are distinguishable from Miida.

Furthermore and can be seen from the excerpts from Miida provided above in connection with the remarks to the §102 rejection, in the sweeping process described in Miida “the carrier pocket 25 is made empty by eliminating the light emitting charges *which have been read*.” As such, it can hardly be said that Miida discloses, describes or teaches a discharging process wherein a prescribed amount of charges *remain* in the charge accumulation region following the discharging operation (as is claimed by Applicant in claim 3). It also can hardly be said therefore, that Miida discloses, describes or teaches a discharging process wherein the control section causes a second gate voltage to be applied to the gate electrode of the transistor section so that the prescribed amount of charges *remain* in the charge accumulation region following the discharging operation (as was claimed by Applicant in pending claim 3 and now claimed in added claim 16).



In regards to claim 6, there also is no disclosure, teaching or suggestion anywhere in Miida, that the first gate voltage being applied is such that a value of a potential barrier between the substrate and the charge accumulation region when the first gate voltage is applied to the gate electrode is smaller than a value of the potential barrier between the substrate and the charge accumulation region when the third gate voltage is applied to the gate electrode. The third gate voltage being the voltage applied to the gate electrode when the pixel unit is configured to accumulate charges in the charge accumulation region being outputted by the light receiving section. As such, claim 6 is considered to be distinguishable from Miida.

As provided in MPEP 2143.01, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the reference include no such teaching, suggestion or motivation.

Furthermore, and as provided in MPEP 2143.02, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, it also has been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. Further, and as provided in MPEP-2143, the

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teaching or suggestion to make the claimed combination and the reasonable suggestion of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). As can be seen from the forgoing discussion regarding the disclosures of the cited reference, there is no reasonable expectation of success provided in the reference.

It is respectfully submitted that for the foregoing reasons, claims 3-7 and 9 are patentable over the cited reference(s) and thus, satisfy the requirements of 35 U.S.C. §103. As such, these claims, including the claims dependent therefrom are allowable.

#### CLAIMS 16-34

As indicated above, claim 16 was added to set forth limitations of pending claim 3 that were eliminated in the foregoing amendment. As also indicated above, claims 17-34 were added to more distinctly claim embodiments of the present invention. These claims are clearly supported by the originally filed disclosure, including the originally filed claims. It also is respectfully submitted that these added claims are patentable over the cited prior art on which the above-described rejection(s) are based.

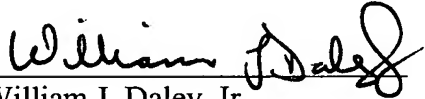
It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

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Because the total number of claims and/or the total number of independent claims post amendment now exceed the highest number previously paid for, authorization is provided herewith to charge the below-identified deposit account for the required additional fees. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. 04-1105.

Respectfully submitted,  
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